

MEMORANDUM of the Army Sanitary Commission on the Report
of the Sanitary Commissioner for Madras for 1879.

Since Mr. Cornish sent in his Report for 1878, he has been appointed Surgeon-General with the Government of Madras, and he has been succeeded in his office of Sanitary Commissioner by Dr. Furnell, by whom the present Report has been prepared.

1. The vital statistics for 1879 appear to prove that Madras Presidency is slowly but surely recovering from the effects of the great famine of 1876-77. The birth-rate is gradually rising, and the death-rate is declining. These facts will be evident from the comparisons which follow, but much depends on the reliance which can be placed not only on the registered facts, but on the calculated population. Beginning with the year preceding the commencement of famine, this abstract contains what information is available:—

Years.	Population.	Births.	Birth ratio per 1,000.
1875 - - - -	30,278,903	638,771	21.1
1876 - - - -	29,157,056	632,113	21.6
1877 - - - -	29,209,542	477,447	16.3
1878 - - - -	29,127,205	348,657	11.9
1879 - - - -	28,991,267	477,762	16.4

There were in 1879, of male births 246,483, and of female births 231,279, or in the ratio of 106.5 males to 100 females. These results represent ratios rather than facts, but they show that, assuming the registration machinery as a constant element, falling off of births due to want of food was passing away.

2. The following deaths were registered during these years:—

Years.	Population.	Deaths.	Death-rates per 1,000.
1875 - - - -	30,278,903	641,260	21.1
1876 - - - -	29,157,056	680,384	23.3
1877 - - - -	29,209,542	1,556,312	53.2
1878 - - - -	29,127,205	810,921	27.8
1879 - - - -	28,991,267	549,390	18.9

It cannot be said that the 1879 results are accurate. All they amount to is, that the abnormal famine death-rate had ceased, but general health still suffered from the results of past privation, for the Sanitary Commissioner states, "With a very large number of persons affected by the food distress, health was not robust. Skin diseases and ulcers were very common. The slightest scratch of the skin would often determine the formation of a large spreading ulcer. The blood in such cases had been impoverished by use of scanty or improper food. Diseases of a scorbutic type were common in the population affected by famine." A similar observation has been made in districts affected by scarcity of food in Bombay Presidency, and some of the details given by Medical Officers as to the nature and amount of destruction of cutaneous tissues in such cases are of the most painful description.

If is sufficient to note the fact that skin degeneration is a result of slow starvation, as is now known to be the case with the mucous tissues of the intestinal canal.

3. The next abstract gives the total deaths from the chief diseases for the same period:—

Years.	Total Deaths.	Cholera.	Small-pox.	Fevers.	Bowel Complaints.
1875 - -	641,260	94,546	24,775	252,042	37,484
1876 - -	680,384	148,193	23,469	230,092	38,176
1877 - -	1,556,312	357,430	88,321	469,241	133,336
1878 - -	810,921	47,167	56,360	374,443	48,083
1879 - -	549,390	13,296	17,840	287,477	23,218

This table affords several important points of comparison. It raises a question on the column of total deaths of this kind—How happens it that, with the same registering machinery in operation, the deaths in 1879 should fall so far below the normal rates of 1875 and 1876? Was there actual inaccuracy of the registration, as we have suggested, sufficient to account for a falling off of some 100,000 deaths from the average of these two years; or was the result only an instance of a general law, that, when in any years great mortality from temporary causes has taken place, most of the susceptible constitutions have been swept away and the more robust left behind, to show a lower death-rate when the exceptional causes have ceased to operate? This observation is not a new one, but the question is again raised partly for consideration in India, and partly as a caution against trusting to lower death-rates under such circumstances as proof of better health generally.

The second column shows that the great cholera epidemic of the famine period was passing away. In 1874 there were only 313 cholera deaths; in 1875 there were 94,546 deaths; the epidemic was then in full force, arriving at its maximum in the famine year 1877, and yielding only 13,296 deaths during 1879. The facts show clearly the epidemic character of cholera at this time, although its severity appears to have been aggravated, mainly by climatic causes, during the famine year. The year 1879 was also a year of a declining small-pox period, which began with 11,252 deaths in 1870, thence attaining its maximum in 1877, and is now receding to its minimum period.

The fever mortality, although still much above the average, had declined greatly since the famine year.

Bowel complaint deaths had fallen greatly below the average of past years.

These details afford a sufficient sketch of the disease history, and we shall next give some account of the diseases themselves.

4. *Cholera*.—The year 1879 was one of those years during which cholera dies out in Madras Presidency, and, after the awful losses occasioned by this pestilence of late years, it is curious to be told as “highly probable” that the year 1880 may be marked as one of almost “complete absence of cholera in Southern India.” Over large areas of country there was no cholera in 1879. The lower Cauvery had some deaths in bounding districts, but the disease covered in force only circumscribed areas in the north-east of the Presidency. Of the total deaths, 13,296 in number, Godavery yielded 9,014 and Kistna 2,389 deaths.

The monthly deaths from cholera were as follows:—

Months.	Deaths.	Months.	Deaths.
January - -	2,945	July - -	4,228
February - -	1,060	August - -	1,671
March - -	561	September - -	310
April - -	333	October - -	109
May - -	450	November - -	24
June - -	1,601	December - -	4

Cholera passed over as an epidemic from 1878, but what may be called a secondary outbreak began in Godavery in April 1879, and accounted for the whole increase shown in subsequent months. Of the 227 registration circles in Madras, 88 furnished cholera deaths. The circles which escaped cholera contained 18,622 villages; the circles which suffered contained 28,703 villages, of which number 1,373 yielded all the cholera deaths. The total cholera death-rate of the year was 0.4 per 1,000 or just one half of the preceding five years average rate. In nine of the attacked districts, the death-rate was so small as scarcely to admit of tabulation. In two districts, it reached 0.4 per 1,000, and it only exceeded this ratio in Kistna, 1.6 per 1,000, and in Godavery, 5.6 per 1,000.

5. On the south bank of the Kistna river, not far from its mouth in Guntur taluq, with a population of 108,964, among which there were 99 cholera deaths in 1879 or 3.5 per 1,000 of the population, Guntur, the municipal town of this taluq has a population of 17,984, and had no cholera. This exemption of the town had occurred on previous occasions, and the Government ordered an inquiry into its causes. We had several times recommended similar investigations into the reasons of exemption as well as into reasons of attack in other localities, and, so far as we know, the present inquiry is the first which has been reported. The facts were ascertained by Dr. Tyrrell, the present Civil Surgeon, at Guntur, and are included by the Sanitary Commissioner in his Report. They occupy too much space to be given entire, but the following abstract will show their nature. The records go as far back as 1848, and the first part of the series may be said to end in 1868, when the town was placed under municipal law. From this date to the present, sanitary work has been in progress, and Dr. Tyrrell himself has acted since 1870 as medical and sanitary officer. To all appearance therefore, we have sufficient means of arriving at the facts.

The first series of records states generally the history of cholera in the town and its vicinity in both of which it appeared almost annually with considerable severity, but there is nothing to show that any steps were taken to mitigate the severity of the disease. The usual course in those days appears to have been to inquire how the disease was brought into the town, not why it was there, and the result was to attribute the town attacks to passing troops, pilgrims, travellers, and the like agencies, and to leave the local causes alone.

During the second period the case has been otherwise. Dr. Tyrrell informs us “that there has been no cholera here since 1868, and its cessation is no doubt due to the changes effected in the town by the introduction of municipal laws which the first vice-president, the late Surgeon Bigg-Wither carried out under great difficulties.”

The following abstract of facts will show what was the condition of the town “in pre-municipal days” as compared with what it is now.

The surface soil was everywhere polluted daily by filth and rubbish of all kinds “which were allowed to accumulate in the courtyards of houses, in open spaces, and by the sides of the streets, lanes, and bye-lanes of the town. . . . The subsoil all over the town was also polluted “with faecal matters which were deposited by the people in the numerous “privies, which were only occasionally I believe cleansed out by letting “pigs run into them to eat up the excrement.”

There were no scavengers. Houses were never cleaned. Rest-houses for travellers, pilgrims, &c., were always filthy. Prickly pear and croton plants were found in every part of the town and outskirts, and were the receptacles of every kind of filth and nuisance.

No attention was paid to the protection of water sources. All classes, from the pariah to the Government official, used the dry-tank beds in the dry season, and the banks in the wet season of the water-supply reservoirs, for the purposes of nature, and water of tanks and of town wells was alike polluted by the washings of dirty clothes and of the

people themselves. To this account of the place may be added the following facts supplied by the Rev. Dr. Unangst, himself a municipal commissioner, and above a 20 years' resident in the town. After confirming the statement made by Dr. Tyrrell, he says that the main bazaar had the appearance of a cattle pen. "In the low lying portions of the town, where the natural drainage is necessarily defective, all hollows became pools of stagnant water in the rainy season, and in places where water from cattle pens and privies ran into them they could be seen in early morning exhaling vapours charged with the foulest stench." With such a state of matters, the Native method of obtaining protection from epidemics was to slaughter annually in sacrifice to the village goddess, and before her idol, several hundred animals—buffaloes, pigs, sheep, goats, and fowls; the people threw the blood over themselves, and the filth and excitement led to outbursts of cholera in the parts inhabited by these poor people, from whence it spread over the town. "On two or three occasions the mortality from cholera was simply frightful." Dr. Unangst has prefixed the following statement to his letter, which is of great importance to the present argument. He says:—"The general condition of the town of Guntur before the Municipal Act was enforced was similar to that of any inland village not disturbed by municipal institutions."

The remedial measures applied by the Municipal Commissioners to Guntur were of no very recondite character, and it may be safely stated that they could be applied to every inland village referred to by Dr. Unangst.

- (1.) "The conservancy of streets, lanes, and bye-lanes, and of all open spaces in the town, is now regularly attended to by scavengers employed by the municipality."
- (2.) There is now conservancy of courtyards, and "nothing noxious can be kept by the people in them, as the conservancy overseer inspects them daily to see if they are kept clean. If filth is found in them, the owner is directed by notice to remove it at once."
- (3.) All clumps of prickly pear or croton plant which could encourage nuisances have been removed, and none such now exist.
- (4.) "At present reservoirs and tanks are watched by men appointed by the municipality, to see that no pollutions are made by the people who resort to them for water. All the public wells are provided with parapet walls, platforms, and posts with wheels to facilitate drawing of water. Most of the wells within private compounds are similarly protected."
- (5.) The food supply is regularly inspected by a servant of the municipality, and unwholesome articles are rejected or destroyed.
- (6.) All houses are cleansed or whitewashed once a year under municipal regulations. The chattrams used by travellers and pilgrims are limewashed as often as considered necessary by the sanitary officer, and no filth is allowed in the courtyards.

Dr. Unangst states that "the silly bloody sacrifices were also suppressed."

The following additional particulars are taken from the Guntur municipal report. Drainage, on the whole, good; principally surface drainage by side cuttings along the streets, running into fields out of town. Scavenging staff adequate, all sweepings and rubbish removed and sold to ryots as manure. Numerous dust bins placed in different parts of the town. There are 14 latrines of improved construction. Night-soil removed and buried in pits outside the town; ryots refuse to use it as manure. It may be here remarked that probably the most effective mode of draining and cleansing an Indian village or town are surface drains and public scavenging of all parts, rather than trusting to

private scavengers. There should in all cases and in all places be a total abolition of cesspits, covered or open; cesspits within houses should be abolished, and for the future be forbidden.

It has occurred to us to suggest that impervious saucer-sectioned surface drains would answer the objects of the municipality much better than cuttings along the streets, and that it is safer to deposit latrine matter in small quantity in shallow trenches, to be immediately covered up and the ground cropped afterwards, or if burial in mass must be resorted to, it is necessary to select ground for the purpose, at such a distance that no drainage from it can reach any water source. It is also safer to have a lined pit or pits for the purpose, and if the latrine matter has some earth thrown in with it, and if the whole be left for sufficient time, valuable manure will be obtained.

6. The results of these excellent municipal measures have been as already stated that cholera has been absent from Guntur since 1868. Dr. Tyrrell says that "cholera has prevailed on some occasions in the neighbouring villages, but no case occurred in the town. Even during the famine, when it was prevalent throughout the district in villages close to Guntur, and also in the famine relief camp situated two miles to the north of it, there was no case developed in the town."

It appears from a passage in Dr. Unangst's letter that cholera cases had been imported into Guntur during certain festivals without risk to the town. And Dr. Tyrrell proceeds: "Now the question which one would be naturally inclined to ask is, why the town, which of yore was frequently visited by cholera, should since the introduction of municipal laws and regulations, based on sanitary principles, be free from it? The answer is, that to the changes which have been effected in the sanitary condition of the town must be attributed the immunity which the town has enjoyed from attacks of the disease. . . . All my endeavours as Sanitary Officer have been and shall be directed to maintain this town in as good a state as I can, and thus far, under God's blessing, the health of this town has been, I am pleased to report, remarkably good." It may be here added from the tables in the Sanitary Commissioner's Report, that the death-rate in Guntur in 1879 from all causes was 18.4 per 1,000, and that the mean of five preceding years, including the famine year, was 18.8 per 1,000. The fever death-rate was only 2.8 per 1,000, and there was not a single death from small-pox.

The evidence in this case appears to be as strong as it is possible to have, not only that it is quite possible to carry out every measure required for the public health in these small towns, but that greatly reduced disease and death rates will follow, and this quite apart from the question of cholera. If, however, we apply the cholera test, and even if we concede the erratic character of cholera epidemics, we have two distinct classes of experience to contrast with each other, both having been matters of record at the time. We have on the one hand 20 years of entire neglect of every sanitary precaution, attended by recurring epidemics of cholera, and on the other, 10 years of efficient sanitary work accompanied by entire immunity from cholera. With these facts before us, are we not justified in calling the attention of the Government, not only of Madras, but of other Indian Governments, to them, and in urging as strenuously as we can the adoption of similar measures elsewhere? At Guntur these results followed on *work done*, and not simply on the application of the act, and in our view the authorities who did the work deserve the highest praise.

7. As another example worthy of being commended and followed may be cited the results of simple and effective sanitary measures adopted at Madras festivals, 12 in number, held in different districts of the Pre-

sidency, between December 1879 and May 1880. These measures were cleansing, providing latrines, protecting water sources and general sanitary regulation. At some of the gatherings 100,000 were assembled, and there was no cholera or any other epidemic among them.

8. *Small-pox*.—As already stated, deaths from small-pox amounted to 17,840, equal to a death-rate of 0.6 per 1,000 of the population, just one half of the average for five previous years. Deaths were returned from 206 out of 227 registration circles, but the proportion of attacked villages is not stated. The following were the monthly deaths:—

Months.	Small-pox Deaths.	Months.	Small-pox Deaths.
January - - -	2,126	July - - -	1,204
February - - -	2,716	August - - -	1,113
March - - -	2,690	September - - -	926
April - - -	1,995	October - - -	899
May - - -	1,234	November - - -	822
June - - -	1,097	December - - -	1,018

These figures mark the passing away of a small-pox epidemic which attained its maximum in March 1878 when 8,693 small-pox deaths were registered. This disease existed in various degrees of intensity in different districts. The highest rate was 2.2 per 1,000 in Godavery district, and there were several districts where the deaths were too few to yield practical ratios. Some doubt is thrown on the registration in certain districts by the discovery that village authorities were in the habit of entering deaths from measles in the small-pox column. There are no means of knowing to what extent this practice was followed, but there is enough in the fact itself to suggest the necessity of careful checking of the registration on this point.

About one half the registered small-pox mortality took place in persons under 12 years of age.

9. The relation of small-pox mortality to vaccination is given as follows:—

The Civil Surgeon at Cochin states that of 225 cases of small-pox, 24 had marks of previous vaccination, and one of the 24 died of dysentery; while of 133 cases unvaccinated 72 died. In the same way at Calicut, an experience of 14 years deaths from small-pox gave 12.8 per cent. in previously vaccinated cases, and 36.2 per cent. among the unvaccinated.

The following method of dealing with local small-pox outbreaks is under trial.

Local officers are obliged to report the disease, and the vaccination staff proceeds at once to vaccinate those inhabitants of the locality whom they may find require it.

10. The vaccination report of the year is given entire. It is long, and is made up of the district executive details not calling for remark. We may, however, state the general results of the year's work.

The following was the vaccination establishment:—

Inspector of Vaccination and Deputy Sanitary Commissioner	-	-	-	1
Deputy Inspectors, 1st Class	-	-	-	31
" " 2nd Class	-	-	-	9
Vaccinators, 1st Class	-	-	-	211
" " 2nd Class	-	-	-	350
Probationers	-	-	-	115
Peons	-	-	-	26

The outlay was 14,979/. The following abstract gives the relation of small-pox deaths to vaccination for seven years:—

Years.	Total Vaccinations.	Small-pox Deaths.
1873-74 - - -	367,445	54,760
1874-75 - - -	428,162	36,777
1875-76 - - -	383,910	24,719
1876-77 - - -	483,192	36,524
1877-78 - - -	787,730	90,255
1878 - - -	521,760	56,360
1879 - - -	469,744	17,840

The numbers vaccinated for three years preceding 1879 include those operated upon in famine relief camps and nurseries. Allowing for these exceptional facilities, 1879 shows distinct advance in this service.

11. Employment of this vaccination staff in sanitary inspection work was being initiated during the year, and Mr. Cornish makes the following statement in regard to it:—"Much attention has been given during the past year to the improvement of the machinery for village inspection. The Deputy Inspectors were submitted to a test of their elementary knowledge of hygiene in November, and some of them did fairly well, while others showed that they knew little or nothing of the subject. A class of officers with some professional training is much to be desired for employment as Deputy Inspectors of Vaccination and Sanitary Inspectors."

It may be suggested whether some aid in instructing officers of this class might not be afforded by medical schools. In 1878 and 1879 Dr. Coates had a class of above 100 in Calcutta Medical College, to whom he delivered lectures on the subject.

12. What we cannot but consider an important administrative proposal on this sanitary question has been laid before the Madras Government by the Board of Revenue and Mr. Cornish; it is, that a revenue district should be taken as the unit of medical and sanitary administration, and that the civil or district Medical Officer, with such additional help as might be necessary, should be made responsible for inspection of minor hospitals, vaccination, and sanitation. Under him would, of course, come the work of vaccination and sanitary inspection. The proposal will, no doubt, meet with careful consideration. If men of the energy and capacity of Dr. Tyrrell and the late Surgeon Bigg-Wither of Guntur could be placed in positions of trust, there is no doubt that good results to the public health would soon be realized. What of all things is now most required is practical aggressive work. That this is possible no longer admits of doubt, and its practicable results may be said to have been already attained in the remarkable case alluded to.

13. *Fevers*.—Under this section of his Report the Sanitary Commissioner makes the following remark, in which we concur. He says: "If the excess periods of fever mortality were carefully compared with the district rainfall, normal and abnormal, probably many things which now appear strange and exceptional, would be referable to general conditions of soil as to moisture, &c." Besides moisture it would be necessary to include temperatures and temperature ranges in such an inquiry, and, as the local conditions remain the same, we might in this way be able more accurately to estimate the effects of climate in producing malaria and in augmenting the local predisposition to fever attacks.

These remarks are here introduced in reference to an outbreak of fever of a severe malarious type in certain villages of Chingleput district, of which the Civil Surgeon, Dr. Macrae, says, that it showed itself under quotidian, tertian, quartan, and remittent forms. The people were all decided in opinion that this fever was a new disease. They had been previously subject to slight continued attacks going off in three or four days, but now the fever returned at intervals. Villages in the neighbourhood on higher ground and more free from vegetation had escaped, while it had happened that friends of the affected people coming on visits and sleeping one or more nights got the disease, but those who returned to their homes the same day escaped it.

The facts clearly show that these fever types were local, and that they were connected with the development of local malaria. The case is such an one as might yield important data towards a history of fever, if it were continuously observed. Probably increase of subsoil water, or malarious dampness of the vicinity from over growth of vegetation, together with increase of rainfall, and probably high temperature ranges, might have acted as fever causes. We have no means of separating the village attacks, but we can compare the fever deaths with the rainfall in Chingleput district, as follows:—

Months.	Rainfall.		Registered Fever Deaths.
	Inches.	Days.	
January - - -	0·82	3	729
February - - -	—	—	496
March - - -	1·51	2	437
April - - -	—	—	392
May - - -	4·61	3	361
June - - -	3·57	7	384
July - - -	5·33	8	587
August - - -	6·80	12	591
September - - -	2·39	4	712
October - - -	12·66	16	831
November - - -	9·16	8	821
December - - -	1·36	3	972

The Chingleput observations are the mean of 7 stations of record, and the totals for each year since 1876, when the famine began, were as follow:—

Years.	Rain Inches.	Days of Rain.
1876 - - - -	19·33	34
1877 - - - -	44·91	57
1878 - - - -	30·14	50
1879 - - - -	48·21	66

There can be no doubt that both tables show a great increase of rain, spread over a larger number of days in 1879 than in the previous years, and that the monthly tables show a large increase of fever deaths in the latter half of the year from the cumulative rainfall after May. It seems very likely that the increase of fever in the affected villages, as well as the change of type, might have been due to these abnormal atmospheric causes calling into activity local causes of malaria which are comparatively inactive at ordinary times. We have dealt with this case simply to point out the direction in which it would be desirable to conduct these local inquiries.

In this case it would be important to give the climatic data for the observing station nearest to the attacked villages, and to examine carefully their local sanitary conditions.

14. The general fever mortality for the Presidency during the famine group of years was as follows, together with the average rainfall:—

Years.	Rainfall.		Registered Fever Deaths.
	Inches.	Days of Rain.	
1876 - - -	27·88	42	230,092
1877 - - -	48·03	68	469,241
1878 - - -	51·28	67	374,443
1879 - - -	44·52	66	285,477

The great increase of fever mortality in the famine year 1877 is clearly shown in this abstract, and it is satisfactory to see that it is resuming its more normal amount.

The following abstract shows the total monthly fever deaths, together with the mean monthly rainfall at 234 stations:—

Months.	Rainfall.		Registered Fever Deaths.
	Inches.	Days of Rain.	
January - - -	0·36	1	39·663
February - - -	0·35	1	29·102
March - - -	1·39	3	24·296
April - - -	0·56	1	21·285
May - - -	6·08	6	18·277
June - - -	5·12	8	18·766
July - - -	7·01	11	20·141
August - - -	6·35	11	21·337
September - - -	3·97	7	22·413
October - - -	7·44	10	22·224
November - - -	4·57	5	22·935
December - - -	1·32	2	25·038

This table shows the same increase of registered fever deaths after cumulative rainfall as does the preceding one for Chingleput, but a comparison of the two shows clearly the advantages to be derived by circumscribing the limits within which the comparisons should be made. Nothing is said in the present Report about removable local causes of these fevers, but this subject should come within the current duties of the newly organized sanitary service. To show its great importance to the economic interests of the country, it may be sufficient to state that 148,113 males, many of them at working ages and supporting families, died of "fevers" in 1879. Deaths from them were returned from every one of the 277 registration circles in the Presidency in that year.

15. *Bowel complaints.*—Deaths under this head were returned from 224 out of 227 registration circles, but the death-rate had undergone great reduction. For the 5 years ending in 1876, when the famine commenced, the death-rate from bowel complaints was 1·3 per 1,000. In the famine districts of 1877 it rose to 6·4 per 1,000, but in 1879 the rate had fallen to 0·8 per 1,000. The Sanitary Commissioner accounts for these great differences as follows:—"The mortality from this cause in 1877 showed the intimate relation between defective food supplies and these diseases. In 1879 food supplies were plentiful and moderate in price, and there was no famine dysentery to speak of, while diarrhoea of a choleraic type was absent from nearly every part of the Presidency." The last remaining concomitant of the famine had thus passed away in 1879, and the following monthly deaths from bowel complaints in 1879

may be here introduced to illustrate the normal incidence of these diseases in ordinary years :—

Months.	Deaths from Bowel Complaints.	Months.	Deaths from Bowel Complaints.
January -	2,509	July -	2,168
February -	1,880	August -	2,319
March -	1,793	September -	2,057
April -	1,638	October -	1,804
May -	1,717	November -	1,694
June -	1,794	December -	1,845

It would almost appear as if the two extremes of heat and cold predisposed to these bowel diseases, but the whole subject connected with their sanitary relations and means of mitigation has yet to be dealt with on the spot. As adjuncts of the famine, they have ceased to add to current mortality. But in all the former famine districts, the poor are still suffering from the effects of low nutrition, showing itself in prevalence of ulcers and other skin diseases, as already stated.

16. *Municipal sanitary works.*—Abstract reports are given by the Sanitary Commissioner, showing the measures adopted for improving the public health, together with the amounts expended in 48 municipal towns (exclusive of Madras). Their population was 1,222,728, their total estimated income was 140,667*l.*, and their sanitary expenditure 36,254*l.*, or 25·7 per cent. of their income. The lowest percentage of the year was at Palghat, a town of 30,752 inhabitants, which expended 11·6 per cent. of its small income, representing a sum of 295*l.* for sanitary purposes, a little over 2½*d.* per head. They might just as well have saved the whole outlay. There must necessarily be a certain outlay on real work before the public health can be benefited, apart from the mere question of percentage. The highest sanitary expenditure was 57·2 per cent. at Ghooty, but this only amounted to 157*l.* for 6,730 people. The following abstract is introduced by the Sanitary Commissioner to show the death-rates from the chief diseases during the last two years in these municipal towns :—

	Deaths per 1,000.	
	1878.	1879.
Cholera -	2·3	0·4
Small-pox -	1·7	1·2
Fevers -	8·9	8·1
Bowel complaints -	8·1	4·1
Injuries -	0·6	0·4
Other causes -	16·7	15·3
Total -	38·3	29·5

In 1879 the death-rate was 8·8 per 1,000 less than in 1878, but of this, the varying element of cholera gave 1·9 per 1,000, and the departing bowel complaint mortality 4·0 per 1,000.

17. The class of sanitary works and measures carried out during the year included, conservancy mainly, surface cleansing, protection of water sources, provision of latrines, surface drainage, and the like. But under all this work, it is evident that the most important and real disease and death causes, those, to wit, resulting from house cesspits, foul houses, uncleansed compounds, and polluted domestic wells, the result of polluted subsoil, were scarcely touched, and the cattle are stalled among the people in many places. Outside surface work is useful on the score of public decency and convenience, and it has a certain beneficial effect on public health; but all past Indian experience

shows that work of this kind requires to be sharply distinguished from real sanitary work within the houses and compounds, and if the whole available municipal funds were applied in this direction, the public health would be far more benefited than it is by present expenditure. There is another point which may be noticed, and this is, that most of the municipal towns on the list are populous, 26 of them have above 20,000 inhabitants each. Some of them greatly exceed this number, and in doing so they come within the category of town populations, whose sanitary work if properly done by hand labour, would entail an outlay beyond their entire income, while there are cases in which hand labour cannot reach the evil. Take for example the case of Salem, a town of 50,012 inhabitants, which has in times passed suffered severely from cholera. The Report states that its conservancy was satisfactory, that sweepings were removed and sold to cultivators. Forty-two latrines had been constructed and night-soil buried until fit to be used as manure. Nothing is said about house hygiene or about house wells. "Many drains exist, but they empty themselves into the river above the parts where the people collect their drinking water," to prevent which, "catchpits were put at the mouths of the drains, the contents of which are removed by the hand in barrels, and thrown beyond municipal limits. In rainy weather, however, the catchpits overflow, and the drainage of the town passes into the river." This engineering operation has the merit of originality, but to estimate its results with more accuracy, the quotation must be continued as follows :—"The drainage of most of the private houses flows into the street drains, in some houses where there are no drains the sewage is left to be dried in the sun or absorbed by the soil." The plan therefore amounts to this, that the town sewage which is not disposed of within the houses is carried by surface channels to the river, where it has to be collected at the outfalls by hand labour and carted away.

The costliness and inefficiency of a drainage system such as this is are self-evident. Our only reason for describing it is to suggest that this town might be selected for the inauguration of a good system of domestic and public sewerage, drainage, and water-supply, whereby the whole problem would be solved. In the meantime it is evident that cleansing operations should include the houses and compounds, all cesspits should be filled up, and all unwholesome house-wells abolished.

Similar points for consideration are suggested by other municipal reports, but the case of Salem is sufficient for our present purpose. The one satisfactory matter in them is that public health work is being done, the unsatisfactory part is that the work is by no means sufficient to meet the necessities, while there are cases in which permanent works are the only apparent remedies for the present evils.

18. *Local Fund Circles.*—Sanitary work among the country population was carried out within these circles, which include a population of 28,609,341; their total income, one third of the land cess, was 135,002*l.*, of which the amount allotted to sanitary purposes was 30,158*l.* The chief work done with this small sum appears to have been providing or repairing wells, cleansing villages, removing superfluous vegetation, protecting water tanks, and the like. It is worthy of record here that in Vizigapatam circle 93*l.* was expended for sinking three new wells, constructing a tank, and repairing seven wells and five tanks, "the sum having been supplemented by an equal voluntary contribution from the villages." Such an example is worthy of being held up for imitation, for not only would the income be notably increased, but, what is of even more importance, the people would be led to take an active interest in their own sanitary welfare. Another matter, stated in the Masulipatam report, is that "a scheme for offering rewards to heads of villages who keep their villages clean is under the consideration of the Board." This also, if followed up, might lead to useful results.

Partly from poverty, partly from ignorance and apathy, little aggressive work has, as yet, been reported from these country circles, but still work is being done, and people are beginning to understand what it means. The new arrangements, under which vaccination officers will carry out sanitary inspecting work, will, it is to be hoped, soon begin to tell in the same direction. The following have been the results hitherto, as stated by the Sanitary Commissioner:—"Deputy Inspectors of Vaccination, paid from local fund revenues, are now employed on sanitary inspection work, and their reports, week after week, contain a universal complaint of the bad conservancy of villages and the utter neglect of the simplest rules of sanitation. Defilement of waste lands and village sites with human excrement is common everywhere, and heaps of manure and other offensive and noxious matters abound on all sides, thus showing how important and necessary it is that conservancy establishments should be employed and extended all over the country, and the rural population made to understand and appreciate the rudiments of sanitation." This statement suggests a question, whether the importance of making use of all this constantly accumulating manure on their fields has been impressed on the native mind? If its value were recognized, village cleansing would more than pay for itself, besides which, an outlet for village manure is as much a necessity as is an outlet for town sewage.

19. A very important step is under consideration, which is mentioned as follows:—"It is in contemplation to utilize the services of Civil or Zillah Surgeons of districts for sanitary inspection work, as Assistants to the Sanitary Commissioner. When this scheme, which is now before the Government, is developed and put in force, it is hoped that by a constant inspection of villages, and defects being brought to notice, more attention will be paid to village sanitation, a regular system of conservancy establishments introduced, and the evil influences exercised by filth and dirt and accumulation of offensive matters on public health will gradually pass away."

If the present year's Report cannot show much progress in real sanitary work, this new organization is at all events hopeful for future progress. It recognizes the necessity of practical village work, and there will be little opportunity under it of wasting time in discussing questions of ætiology and cholera importation, of which, however, there is only one case in the present Report, and it ought to be noticed, as showing the kind of work which Zillah Surgeons ought to keep clear of, if they are to do efficient sanitary reporting. The Zillah Surgeon at Rajahmundry adduces these facts as clearly proving that cholera was imported into the town by the 29th Regiment, Native Infantry, in December 1878. "On the 18th December," he says, "some followers of the regiment were seen in the town that day, and on that night a bricklayer was suddenly seized with the disease, and died after a few hours illness." The regiment arrived on the following day, and two children were brought into the station ill of the disease. On the 20th two cases took place among the men, and the following morning the regiment left. In this instance the only causative relation is between the "followers" who "were seen" and the bricklayer who died the same night. The inference can scarcely be said to rest on evidence; but, in order to avoid similar mistakes in the new district sanitary work, it may be stated that Rajahmundry is one group of population out of 873 groups in Godavery district which suffered from cholera in 1878; that cholera prevailed in this district every month of 1878; that in the course of the year 1878 there were 9,548 cholera deaths there, and that in December, the presumed importation month, there were 506 cholera deaths in Godavery district; that in this district the epidemic passed over to 1879, and in the month of January yielded 985 deaths, and 9,014 deaths for the year; and that in 1879 the three municipal towns, Ellore, Rajahmundry, and Cocanada, had respectively 175, 72, and 81 cholera deaths. Let us next see what the Report

says about the sanitary condition of Rajahmundry itself, which will be the future care of the local Surgeon. Drainage of part of the town very defective, a suburb lies on low ground, and, during the rains, becomes a vast swamp. "Cesspits exist in private houses, which are cleaned by the municipality." Back-yards of private houses kept very dirty. "Cattle are tied in them, and there is no drainage of the fluid, excreta, &c. . . The main streets are kept clean, but the outskirts of the town are very dirty, and are largely used for the purposes of nature. Many vacant sites exist which are in a very dirty state. . . Most of the wells in the town contain brackish water,"—no doubt, from subsoil pollution. As a mere point in sanitary work, it is obvious that since merely local officers cannot be cognizant of all the facts bearing on disease development, they ought to avoid all such statements as those we have been dealing with about the Rajahmundry cholera, and that they will do more good in the way of disease mitigation by following the example of Guntur, in the adjoining Kistna district, than by fruitless ætiological discussions, which the facts given above as to the sanitary state of Rajahmundry show to have no relation to the necessities of the case.

20. *Stations of British and Native troops.*—The sanitary history of the Madras British and Native Army has been dealt with on other papers, and it will be sufficient to state simply the years' results as follows:—

	Strength.	Ratios per 1,000.			
		Admitted.	Daily Sick.	Died.	Invalided.
British troops *	11,293	1,438·7	68·4	16·8	44·5*
Native troops serving in Presidency stations.	22,033	1,001·2	40·4	14·2	38·9

* Only 10·2 per 1,000 for discharge.

About 2 per 1,000 of deaths among British troops arose from cholera at Thyetmyo in Burma, otherwise the year's death-rate was not excessive. There have been years when the admission-rate has been higher than in 1879, but it was above the average of former years. The health statistics of Native troops had been somewhat interfered with by service in malarious districts. As usual, most of the admissions arose from malarial fevers, the increase in this class of diseases having been due apparently to large augmentation in the rainfall at certain stations and to damp chill weather.

The usual abstract of station reports is given, but we have on previous occasions pointed out that they contain so little practical information on sanitary condition that no use can be made of them. They state generally the opinion of the reporters on the subject, but when we have, as in the case of Bellary, an admission-rate of British troops equal to 2,275·4 per 1,000, with a constant sick-rate of 109·2 per 1,000, and a death-rate of 18·3 per 1,000, nearly double the previous 13 years' average mortality, and this too in the absence of cholera, we require a very distinct and detailed account of the local and personal causes of such a state of matters. A mere excess of rain so stated affords no explanation of the facts. There must have been a "why" the rain led to such a result. A similar unhealthy condition existed among prisoners in Bellary jail, among whom ulcerative stomatitis existed, and there were no fewer than 39 admissions from gangrene, of which 35 cases proved fatal. The death-rate in this prison was actually 107·9 per 1,000 in 1879. Now this state of matters both among troops and prisoners admits of being accounted for, and most of it remedied, no doubt. All we can do is simply to repeat what has been said before on the subject of these reports of military stations. Possibly a more detailed form, such as has been adopted by the Sanitary Commissioner

with the Government of India, might be adopted with advantage. What is really wanted for practical work is that when excess of deaths or inefficiency shows itself at any station the local sanitary authorities should be able to state the reasons and apply or recommend the remedies.

21. *Jails*.—The jail statistics of Madras Presidency appear to show improved health generally since the famine ceased. The following abstract gives the comparative ratio for years since 1875, the year before the famine:—

Years.	Total Admissions per 1,000.	Death Ratios per 1,000.					Total Deaths per 1,000.
		Cholera.	Dysentery.	Diarrhoea.	Dropsies.	Anæmia.	
1875	752.6	4.1	6.4	7.7	3.5	0.9	38.7
1876	703.6	10.0	7.7	5.3	2.2	0.9	42.4
1877	971.3	25.7	32.1	50.1	5.8	2.0	175.4
1878	944.4	5.1	15.0	28.2	13.1	1.2	125.4
1879	890.5	1.4	10.3	10.2	5.9	0.9	55.8

The figures still show the lingering effects of deficient nourishment. But on the whole there is a tendency to return to the greatly reduced disease and death rates which preceded the famine years 1876–77. These ratios are, of course, made up of maxima and minima, as is shown to be the case by a few comparisons from a list of 34 jails given in the Report as follows:—

Death Ratio per 1,000 in 1879.

Jails.	Ratio.	Jails.	Ratio.
Guntur	5.1	Bellary	107.9
Chingleput	11.3	Cuddapah	112.0
Penitentiary, Madras	12.9	Trichinopoly	120.2
Russelkonda	13.7	Coimbatore	137.7
Vellore, Central	14.3	Kurnool	147.9
Ootacamund	15.1	Vizagapatam	226.3
Salem	103.6		

With such figures before us, it is impossible to avoid asking the reason of them, and as preventable deaths in prison are really added death penalties, no such deaths should be allowed to pass without rigid inquiry into not only the fact, but the cause of the fact, with a view to immediate remedy.

22. In the preceding paragraphs, we have given the chief practical results of this interesting Report. Madras is recovering from the famine; good sanitary work, as far as it goes, is being done in municipalities and in many local fund circles, but it falls very far short of the requirements of public health. The Government has taken an important step in organizing the vaccination inspecting staff with a view to continuous sanitary inspecting work in villages. The proposal to combine the work of Officers of Health and of district sanitary inspection work with the duties of Zillah Surgeons will apparently be productive of much good, provided the fact be fully recognized (as its importance is shown by examples at Guntur and Rajahmundry) that discovery and removal of local causes of disease is the one object of this arrangement, and that it is, in no sense, intended for supporting any disease theories whatever.

But before sanitary works and regulations can be of the greatest use they must be made popular, and no man will make his work acceptable who performs it apathetically, or under the influence of disease theories, which draw him in one direction while his real duties lie in another direction altogether.

Lastly, although it is no part of our duty to propose administrative arrangements for executing public health measures, we cannot help feeling that the proposal to adopt the revenue district as the unit of medical and sanitary administration which has been under consideration of the Government will, if adopted, lead to future advance in sanitary improvements.

12th May 1881.

GOVERNMENT OF MADRAS.

PUBLIC DEPARTMENT.

6th October 1881, No. 1362.

Sanitation.

Read the following paper :—

Despatch from the Most Honorable the Secretary of State for India.

Statistics and Commerce,
No. 15 [Current No. 1626-A].

INDIA OFFICE, LONDON,
14th July 1881.

- SIR,—I forward 130* copies of a Memorandum by the Army Sanitary Commission on the Report of your Sanitary Commissioner for 1879.
- * 12 by Mail.
118 through Store Department.
2. Although some improvement has taken place in the health of the jail population, the mortality in certain jails is still excessive and demands inquiry.
3. I shall be glad if you will give special attention to the remarks of the Army Sanitary Commission in paragraphs 13 and 14 on the necessity of tracing the local causes of fever outbreaks, and to those in paragraph 20 on the deficient information contained in the abstracts of Army station reports.

I have, &c.,

(Signed) HUGH C. E. CHILDERS.

To His Excellency the Honorable
The Governor in Council, Fort St. George.

ORDER THEREON, 6th October 1881, No. 1362.

Recorded and communicated to the officers concerned.

2. The attention of the Inspector-General of Jails will be drawn to the remarks of the Army Sanitary Commission with reference to Jail statistics (paragraph 21 of the Memorandum), and that of the Sanitary Commissioner to paragraphs 13, 14, and 20.

(True Extract.)

To the Sanitary Commissioner,
" Surgeon-General with the Government of Madras,
" Inspector-General of Jails,
" Revenue Department,
" Military Department,
" Public Works Department,
" Board of Revenue,
" Presidents of Local Fund Boards and Municipalities,
" Government Astronomer,
" Inspector-General of Police,

Exd. T. O'Connor.

with copy of the Memorandum.

J. Davis
Chief Secretary

P. N. C. No. 6091
Govt. of (1881) Madras.

PUBLIC.

B. No. 2623 W. of 26th Oct. 1881

Recorded.
Recorded.



To
THE SANITARY COMMISSIONER,
&c., &c., &c.

Dated October, 6th.

2-1

Issued

Recd.

21 Oct. 81

Encl.

G.O., 6th October 1881, No. 1362.

S. S. C.

OCT 1881

Sanitation.—Communicating Despatch from the
Secretary of State forwarding copies of a Memo-
randum by the Army Sanitary Commission on
Report of the Sanitary Commissioner, Madras, for
1879.

No. 2623 W. of 26th October 81

B.

With order

Entd. in Receipt Regr

Indexed 29/10